CLAIMS

What is claimed is:

1. An electronic device, comprising:

a substrate having a trench with a lower portion and a top portion; and

wherein the lower portion of the trench is filled with a cured spin-on compound, and the top portion is filled with a chemical vapor-deposited compound.

2. The device of claim 1 wherein the substrate has a surface that is substantially coplanar with a top surface of the chemical vapor-deposited compound.

3. The device of claim 2 wherein the trench further comprises a thermal oxide coat.

4. The device of claim 3 wherein the trench has an aspect ratio (depth/width) of no less than 5.

5. The device of claim 3 wherein the trench has an aspect ratio (depth/width) of no less than 8.

6. The device of claim 1 wherein the spin-on compound comprises silicon.

7. The device of claim 1 wherein the spin-on compound is formed from at least one compound selected from the group consisting of methylsilsesquioxane, hydrogensilsesquioxane, methylhydridosilsesquioxane, silicate, and perhydrosilazane.

8. The device of claim 1 wherein the chemical vapor-deposited compound comprises silicon.

9. The device of claim 1 wherein the chemical vapor-deposited compound is formed from silane or tetraethylorthosilicate.

10. The device of claim 1 wherein the trench has a depth, and wherein the lower portion of the trench extends up to 60% of the depth.

11. The device of claim 1 wherein the trench has a depth, and wherein the lower portion of the trench extends up to 80% of the depth.

12. A method of forming a shallow trench isolation structure, comprising:

forming a trench in a substrate having a surface, and depositing a first compound into the trench using spin-on deposition;

partially removing the first compound from the trench such that an upper surface of the compound is below the surface of the substrate; and

depositing a second compound onto the substrate surface and onto the upper surface of the first compound by chemical vapor deposition.

13. The method of claim 12 further comprising planarizing the isolation structure such that the surface of the substrate and an upper surface of the second compound are substantially coplanar.

14. The method of claim 12 wherein the substrate surface and the trench further comprise a thermal oxide coat.

15. The method of claim 13 wherein the trench has an aspect ratio (depth/width) of no less than 5.

16. The method of claim 12 further comprising curing the first compound to form an oxide.

17. The method of claim 12 wherein the step of partially removing comprises a process selected from the group consisting of a spin-rinse process, a wet etch process, and a dry etch process.

18. The method of claim 12 wherein the first compound is formed from at least one compound selected from the group consisting of methylsilsesquioxane, hydrogensilsesquioxane, methylhydridosilsesquioxane, silicate, and perhydrosilazane.

19. The method of claim 12 wherein the second compound is formed from tetraethylorthosilicate or silane.

20. A method of removing a spin-on compound, comprising:

spin-depositing a spin-on compound on a surface of a substrate; and

spin-rinsing the spin-on compound with a solvent mixture, wherein the solvent mixture comprises a first solvent that dissolves the spin-on compound, and a second solvent that is inert to the spin-on compound.

21. The method of claim 20 further comprising heating the substrate to a first temperature to remove the solvent mixture, and further heating the substrate to a second temperature to cure the spin-on compound.

22. The method of claim 20, wherein the spin-on compound comprises silicon, wherein the first solvent comprises propyl acetate, and wherein the second solvent comprises ethyl lactate.

23. The method of claim 20, wherein the spin-on compound comprises silicon, wherein the first solvent is selected from the group consisting of a ketone, an ester, an ether, a hydrocarbon, and wherein the second solvent is selected from the group consisting of water, an alcohol, acetonitrile, an amine, and an amide.